



Caltrans Division of Research,  
Innovation and System Information

# Research Results

Transportation  
Safety and  
Mobility

## FEBRUARY 2015

**Project Title:**

California IntelliDrive Test Bed Upgrade  
(Federal Portion)

**Task Number:** 2297

**Start Date:** October 1, 2011

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**Product Category:** New or improved tool  
or equipment

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## Upgrading California's Connected Vehicle Test Bed

*Rejuvenated test bed provides a testing ground for the next  
generation of connected vehicle applications*

### WHAT WAS THE NEED?

California's Connected Vehicle Test Bed is a federally funded resource available to developers to test how connected vehicle technologies perform under real-world conditions. The test bed spans 11 consecutive intersections along a 2-mile stretch of the highly traveled arterial of El Camino Real SR-82 in Palo Alto. It provides an actual, operational environment where intersections, roadways, and vehicles are able to communicate through wireless connectivity. Established in 2005, the Connected Vehicle Test Bed was the nation's first Dedicated Short Range Communication (DSRC) test site to assess this wireless communication standard designed specifically for automotive use and connected vehicle applications and technologies.

After many years, the test bed needs to be upgraded. It uses an earlier generation of DSRC radios that are now obsolete. However, the test bed's infrastructure and location play an important role in that it is in close proximity to many automobile research labs and the Silicon Valley. With new technology, the Connected Vehicle Test Bed can continue to serve as an incubator and proving ground for connected vehicle technology and applications.

### WHAT WAS OUR GOAL?

The goal was to upgrade and rejuvenate the existing DSRC installations along Highway 82 so that the test bed is equipped and able to be a resource to develop and evaluate today's connected vehicle technologies.

*DSRC radio at Page Mill Road  
on SR-82*



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integrated and efficient transportation  
system to enhance California's  
economy and livability.

## WHAT DID WE DO?

Caltrans, in partnership with the University of California, Berkeley Partners for Advanced Transportation Technology program, worked in close coordination with the U.S. Department of Transportation's Intelligent Transportation Systems Joint Program Office (ITS-JPO), which provided the contractors and upgraded DSRC radios to be installed. The researchers first surveyed the DSRC sites and developed installation designs. The contractors installed the DSRC radio systems and tested the connections between the radios and the local traffic signal controllers, along with a fourth generation, commercially available backhaul network. The backhaul connection provides links to the radios so that researchers performing experiments can monitor their tests. It also enables connections with other national connected vehicle test sites being developed by the ITS-JPO.

## WHAT WAS THE OUTCOME?

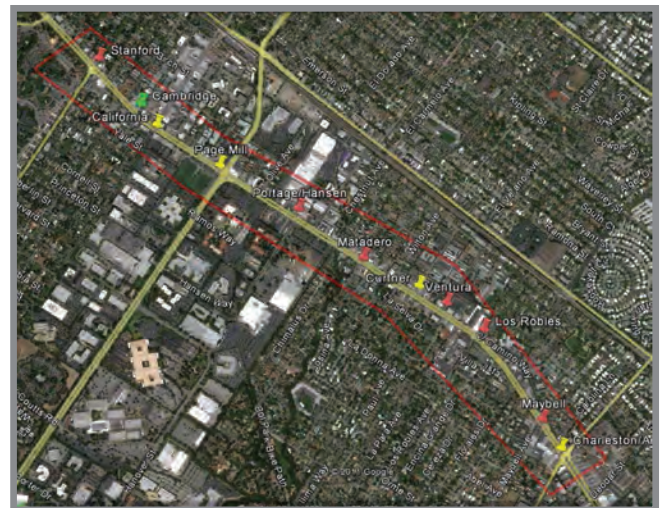
The test bed is fully functional, consisting of 11 locations on Highway 82, and the radios can communicate with suitably equipped vehicles in their vicinity. It is now compliant with national standards and can be used as a platform to test the operational status of current applications.

## WHAT IS THE BENEFIT?

The upgraded test bed provides up-to-date equipment and infrastructure for government agencies and the private sector to test their connected vehicle applications and perform certification activities. The test bed supports cutting-edge research for connected vehicle safety, mobility, and infrastructure-related applications, services, and components. It serves as a real-world platform for regional industries and research labs.

## LEARN MORE

To view the complete report:  
[www.dot.ca.gov/research/researchreports/reports/2015/final\\_report\\_task\\_2297.pdf](http://www.dot.ca.gov/research/researchreports/reports/2015/final_report_task_2297.pdf)



Locations of the 11 intersections  
on SR-82